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Conepatus talarae n. sp.
from the Talara Tar-seeps, Peru

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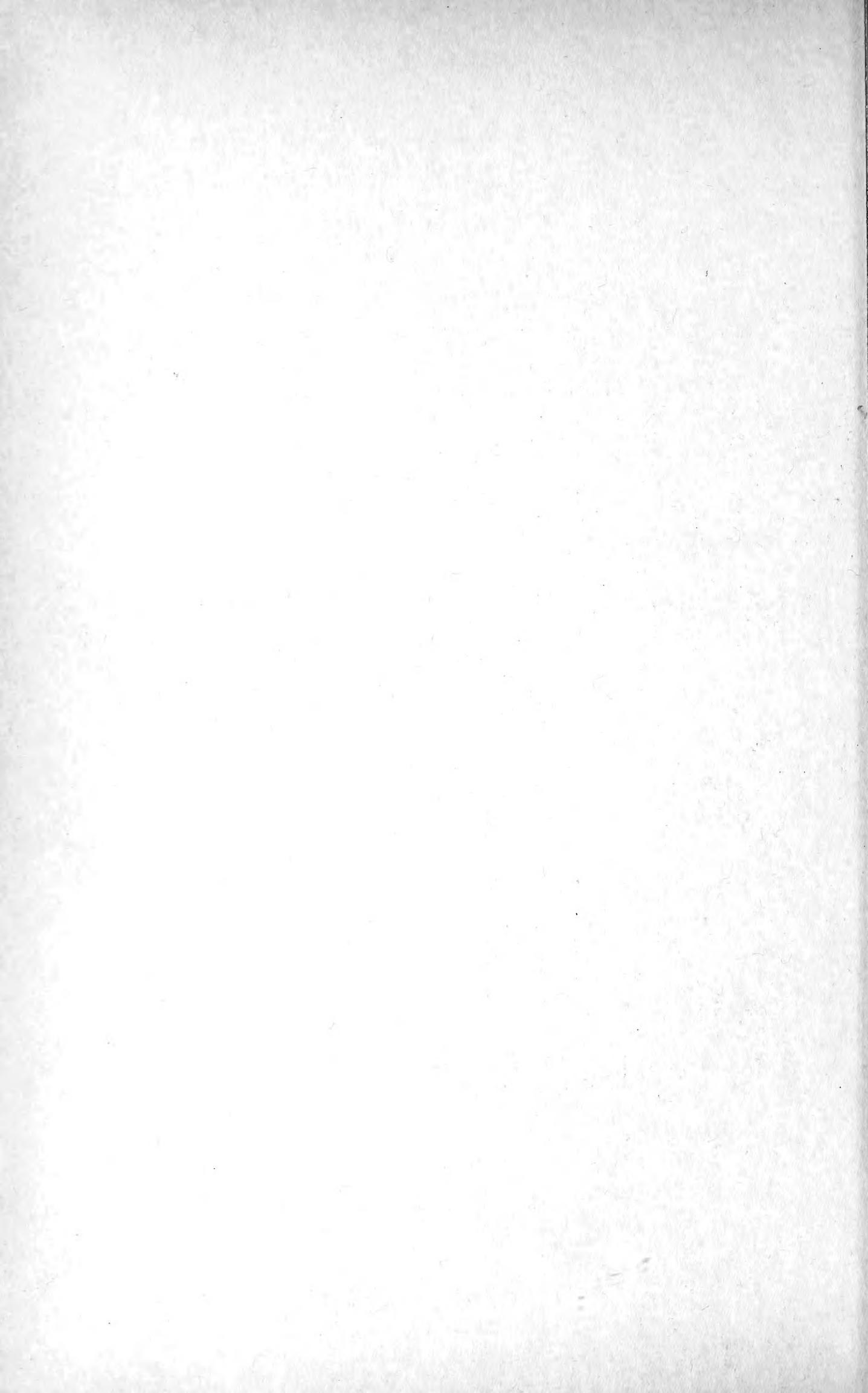


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Conepatus talarae n. sp.
from the Talara Tar-seeps, Peru

C. S. CHURCHER is a Research Associate in the Department of Vertebrate Palaeontology, Royal Ontario Museum, and Assistant Professor of Zoology, University of Toronto.

C. G. VAN ZYLL DE JONG is a graduate student in the Department of Zoology, University of Toronto.

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ABSTRACT. A new hog-nosed skunk, *Conepatus talarae* n. sp., is described from cranial, mandibular, dental and post-cranial material from the Pleistocene of Talara, Northwest Peru. It is distinguished from neighbouring species by its smaller size, and from species of approximately the same size by the shape of the mandible, the constant proportion of the trigonid in the crown of M_1 , the conformation of M^2 , and its geographical isolation from other similar-sized species.

INTRODUCTION

Modern representatives of the genus *Conepatus* are known from South and Central America and northwards into the southern United States (Cabrera, 1957, Hall and Kelson, 1959). Fossil representatives were first reported from South America by Ameghino who originally described *Conepatus mercedensis* as *Triodon mercedensis* in 1875, referred it to *Mephitis* in 1889, and finally to *Conepatus* in 1906, and *C. cordubensis* as *Mephitis cordubensis* in 1889, both from the Pampean (Middle to Upper Pleistocene) of Buenos Aires Province. Burmeister (1879) described *C. primaevus* (=*Mephitis primaeva*) from Buenos Aires Province, subsequently assigned to the Ensenadian by Kraglievich (1934). Rusconi (1932) described *C. mercedensis praecursor* from the Ensenadian of Buenos Aires Province and dated this as Middle Pleistocene. Later Reig (1952) described *C. altiramus* from the Chapadmalal Formation of the Barranca de Los Lobos between Mar del Plata and Miramar, also Buenos Aires Province, which he dated as Upper Pliocene but which is now considered Lower Pleistocene (Dr. Rosendo Pascual, *pers. comm.*), and also raised Rusconi's (1932) subspecies to a full species as *C. praecursor*. A non-Argentinian fossil *Conepatus* was reported by Boule (1920) from the Pleistocene deposits of Tarija, Bolivia, as *C. cf. suffocans*. This specimen is referred to *C. chinga* by Hoffstetter (1963). *Conepatus* sp. has been listed from Talara by Lemon and Churcher (1961).

North American fossil material is represented by *Conepatus*, probably *C. leuconotus mearnsi*, reported by Hall (1960) from the late Pleistocene deposits of San Josecito Cave, Nueva Léon, Mexico; *C. mesoleucus* by Schultz and Howard (1935) from Burnet Cave, Eddy County, New Mexico; and *C. leuconotus* by Ray *et al.* (1963) from the Pleistocene deposits of Haile, Alachua County, and Williston, Levy County, Florida. An additional and excellently preserved left mandible from Haile VII, Alachua County, Florida, now in the Vertebrate Paleontology Collection of the University of Florida (No. UF 4498), was noted by Dr. Pierce Brodkorb while Ray *et al.*'s paper was in press. Dr. Clayton E. Ray (*pers. comm.*) suspects "that it might be the mate to the scrappy right ramus that" was reported in Ray *et al.* (1963).

The Talara material is geographically well separated from all previous records and, because of its relative abundance and good preservation, deserves description and identification.

LOCALITY AND HORIZON

The tar-seeps of Talara are located some 10 miles southeast of the town of Talara (Lemon and Churcher, 1961) within the La Brea pool of the International Petroleum Company's concession in Northwest Peru. The seeps occur on the Mancora Tablazo or beach about 6 miles west of the edge of the main breccia-fan emanating from the Amotape Mountains. These seeps have built up by the accretion of dust in the soft tar to a level slightly above that general to the tablazo.

The Talara tar-seeps have been dated as Late Pleistocene on the faunal and geologic evidence and are considered approximately contemporaneous with the Carolinian (Upper Pleistocene) deposits from La Carolina, Santa Elena Peninsula, Southwest Ecuador, described by Hoffstetter (1952) and others.

Family	MUSTELIDAE
Subfamily	Mephitinae Gill
Genus	<i>Conepatus</i> Gray
<i>Conepatus talarae</i> , n. sp.	

Holotype. Right mandible with P₂, P₃, P₄ and M₁, Royal Ontario Museum Vertebrate Palaeontology Collection No. 2103.

Paratype. Right premaxilla and maxilla with M¹, damaged. ROM—VPC No. 4345.

Referred material. All remaining 59 specimens associated with the Type and Paratype are deposited and catalogued in the Vertebrate Palaeontology Collection of the Royal Ontario Museum, to which all numbers cited refer.

Locality. Talara tar-seeps, Peru.

Horizon. Talaran, Upper Pleistocene.

MATERIAL

Some 61 whole, damaged or partial skeletal and dental elements assignable to *Conepatus* have been recovered from the tar-seeps. This material was collected by Dr. A. G. Edmund and Mr. R. R. Hornell during the Royal Ontario Museum Expedition to these seeps in 1958. The material has been prepared subsequently by Mr. R. R. Hornell and the senior author.

All of the specimens are stained black from the asphalt. No signs of abrasion, scoring or wear within the asphalt are observable. Such wear and breakage as is present presumably occurred prior to the fossil's entombment or during recovery when a fresh fracture is visible.

The material collected could derive from a minimum number of individuals of 7, comprising 2 adults and 5 sub-adults, the number being founded upon the sample of left humeri. Much of the material derived

from juvenile or sub-adult individuals as was substantiated by the absence of epiphyses and centra from many of the specimens.

Specimens recovered include 6 right (2102, 2103, 4330, 4332, 4336, 4337) and 4 left (4331, 4333, 4334, 4335) mandibular fragments, 2 right (4345, 4347) and 2 left (4346, 4348) maxillary and a left premaxillary fragment (4350). Teeth available, specimen numbers for which are given in Tables 1 and 2, either *in situ* or loose, include a right C_1 , 2 right P_2 's, 4 right and 2 left P_3 's, 2 right and 3 left P_4 's, 5 right and 2 left M_1 's, a partial crown of a M_2 , 5 right and 3 left P^4 's, and 4 right and 2 left M^1 's. Axial elements are represented by an adult (4367) and 3 subadult cervical vertebrae (4368–70) and a rib (4373). The forelimb is represented by 10 whole or partial humeri comprising an adult (4351) and 2 subadult right (2850, 4357) and 2 adult (2853, 4354) and 5 subadult left elements (2851, 4352, 4353, 4355, 4356), by a subadult left ulna (4359), and right (4361) and 2 left (4360, 4362) subadult radii, a right scapholunar (4374) and adult left metacarpals III (4379) and V (4377). The hind-limb and girdle are represented by 2 left ilia (4363–4), the distal epiphysis of a left femur (4365), an adult left tibia (2852) and the proximal epiphysis of a right tibia (4366), single adult (4371) and subadult right (4372) calcaneum and 2 adult left (4375–6) calcanea and an adult left metatarsal III (4378).

DESCRIPTION

The Talaran *Conepatus* is of approximately the same size as the smaller living species of the genus, e.g. *C. humboldti*, *C. mesoleucus*, and is definitely smaller than living *C. rex*, *C. quitensis*, *C. semistriatus* or *C. leuconotus*.

The mandible of the Talaran *Conepatus* is strongly built, the ventral margin slightly concave and nearly parallel to the alveolar margins, a strong ventral belly beneath M_2 , the mental border of the symphysis slopes strongly forward, the coronoid process slopes backward from M_2 , is squared at the top and projects posteriorly over the articular surface of the condyle. When unworn the teeth are set close together and contact-facets can develop between neighbouring teeth. M_1 possesses a nearly isolateral trigonid and its talonid is longer mesiodistally and broader buccolingually than the trigonid, thus occupying more than 50 per cent of the occlusal surface of the tooth. When unworn the paraconid-protoconid shearing surface is slightly convex and lies at $\pm 45^\circ$ to the lingual surface of the tooth. The talonid exhibits a well-defined lingual entoconulid distal to the entoconid and two or more additional cuspules may occur on the distobuccal margin distal to the hypoconid. Measurements of the mandibles and lower dentitions are given in Table I and the type-specimen is illustrated in Figure 1.

The upper dentition is represented only by P^4 and M^1 although alveoli of all the other teeth are known. P^4 is longer mesiodistally than buccolingually.

TABLE I—Measurements in mm of the mandibles and lower dentitions of *Conepatus talarae* n. sp. "L" and "R" indicate left or right elements, "e" an estimated and "a" an alveolar measurement

Conepatus SPECIMENS FROM TALARA, PERU

Dimension	2102R	2103R	4330R	4331L	4335L		Fragmentary or Single Specimens	N	Parameters Max.-Min.	X̄
Length of mandible from condyle to anterior incisive alveolus	—	45.5e	42.5e	—	—			2	45.5e-42.5e	44.0e
Length of mandible from condyle to mesial surface of C ₁	—	42.7e	41.9e	—	—			2	42.7e-41.9e	42.3e
Depth of ramus between P ₃ and P ₄	7.6	8.2	7.2	6.0	7.2			7.2	6	7.2
Depth of ramus beneath protoconid of M ₁	6.8	7.0	7.0	5.9	7.0			6.4	6	6.7
Depth of ramus distal to M ₂	8.7	9.7	10.0	9.1	9.8			4333L	7	10.0 - 8.7
Height of coronoid above angle	—	21.9	—	—	—			4337R	7	9.3
Height of condyle above angle	—	11.5	10.8	—	—			19.6	3	21.9 - 19.6
Length C ₁ -M ₂	24.0a	25.1a	24.0a	24.5a	—			11.1	5	20.7
Length P ₂ -M ₂	22.2a	22.0a	21.6a	20.0a	21.4a			10.2	4	11.5 - 10.1
Length M ₁ -M ₂	11.5a	12.9a	13.1a	12.0a	12.2a				5	10.7
Mesiodistal diameter of C ₁	—	3.5a	—	4.0a	—			4338R	5	24.4a
Mesiodistal diameter of P ₄	3.9	4.2	—	4.1	4.2			4340L	5	21.2a-20.0a
Buccolingual diameter of P ₄	3.3	3.1	—	3.8	3.9			4.6	5	21.4a-20.0a
Mesiodistal diameter of M ₁	8.0	8.8	8.8	8.2	9.0			3.7	5	22.2a-20.0a
Mesiodistal length of trigonid of M ₁	3.5	4.0	4.0e	3.7	4.4				5	21.4a-20.0a
Buccolingual diameter of M ₁ over metacoenid	4.2	4.2	5.0	4.6	4.7				7	12.3a
Buccolingual diameter of M ₁ over talonid	4.4	5.0	5.0	4.8	5.0				5	13.1a-11.5a
								4.2	3	12.3a
									4.2 - 3.5a	3.9

ally and its protocone is reduced to a mesiodistally compressed and low-crowned arcuate ridge placed lingual to the paracone. M^1 is longer buccolingually than mesiodistally and possesses a rhomboid shape. The paracone-metacone ridge is dumbbell-shaped or crescentic when unworn, the protocone is a low crowned ridge similar to but more prominent than that of P^4 . The hypocone is a roughly semicircular shelf lying distolingually and together with the distal margin of the metacone forms the posterior face of the tooth. Measurements of the upper dentitions and adult postcranial elements are given in Table 2 and selected specimens illustrated in Figures 2 to 6.

The postcranial material is not markedly distinguished in any way from other mephitine postcranial elements. Adult specimens only are illustrated for comparative purposes in Figures 3 to 6.

DISCUSSION AND IDENTIFICATION

The fossil skunk from Talara only requires confirmation as *Conepatus* and comparison with known species of the genus for possible specific reference. Ray *et al.* (1963, Table III) give 8 characters of M_1 , P^4 and M^1 by which *Conepatus* may be separated from *Mephitis*. When the described characters of these teeth in the Talaran skunk are compared with those enumerated by Ray *et al.*, the skunk is identified as *Conepatus* on all 4 characters of M_1 and both characters of P^4 but not absolutely by both characters of M^1 . Ray *et al.* (1963) state that M^1 is "longer than wide or occasionally subequidimensional, lingual half of crown displaced posterad so that hypocone is most posterad portion of tooth" and "deep, narrow notch rarely present immediately mesad of metacone. Outline of crown not dumbbell-shaped". The unworn M^1 's of the Talaran skunk are wider buccolingually than mesiodistally (Table II and Fig. 1b) and, while the hypocone occupies the distolingual position, its margin is not always the most distal part of the tooth. The outline of the crown is neither dumbbell-shaped, as is usual in *Mephitis*, nor is it pear-shaped as illustrated by Ray *et al.* (1963, Fig. 4A) but rather rhomboid with smaller

OVERLEAF

Figures 1 to 6—Adult Skeletal Elements of *Conepatus talarae* n.sp. Cross-hatched areas indicate broken or alveolar areas. Dotted lines indicate restored outlines.

- 1 Right premaxilla, maxilla and part of jugal with P^4 - M^1 . *Paratype*, No. 4345. Aspects: a—lateral; b—occlusal.
- 2 Right mandible with P_2 - M_1 . *Type*, No. 2103. Aspects: a—lateral; b—lingual; c—occlusal.
- 3 Left humerus, No. 2853 with restored lateral part of condyle from No. 4351. Aspect: a—anterior; b—medial; c—proximal; d—distal.
- 4 Left tibia, No. 2852. Aspects: a—lateral; b—anterior; c—proximal; d—distal.
- 5 Right scapholunar, No. 4374. Aspects: a—proximal; b—palmar.
- 6 Right calcaneum, No. 4371. Aspects: a—medial; b—dorsal.

0 50

Scale - mm

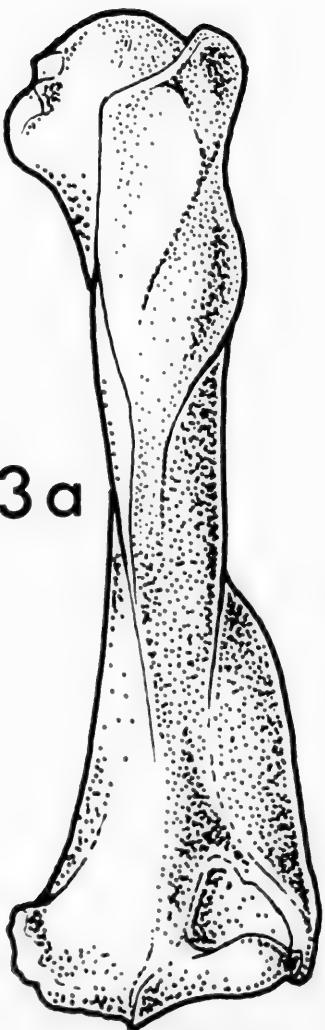
1a



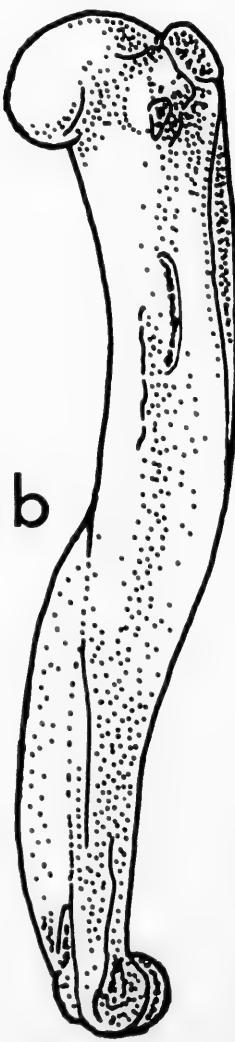
2a



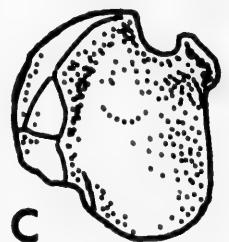
3a



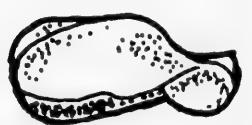
3b



3c



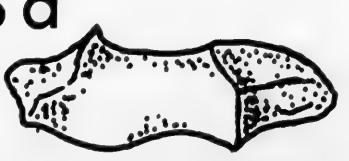
5a



6a



3d



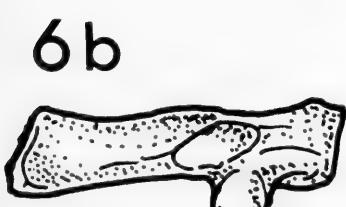
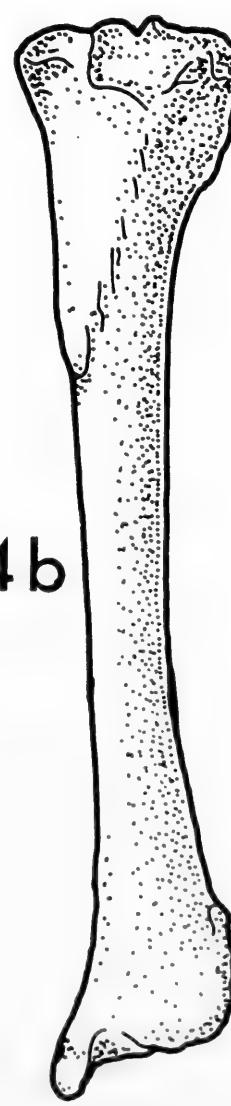
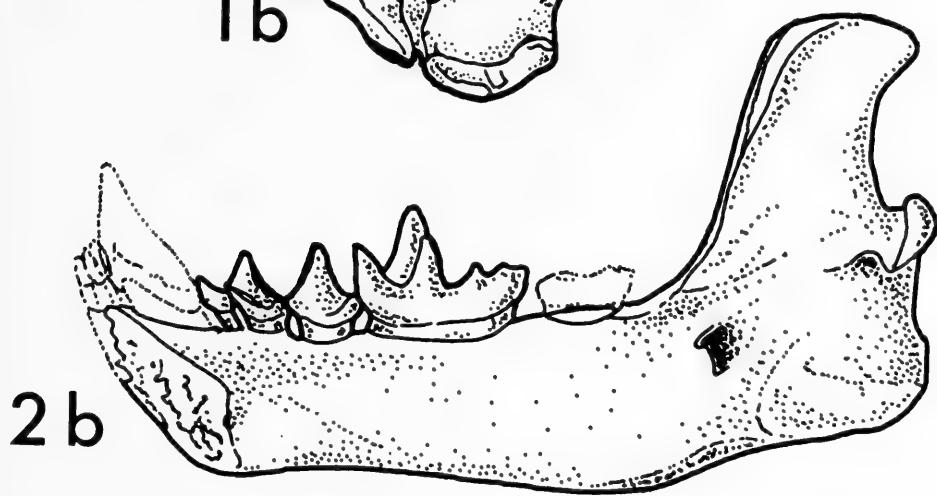
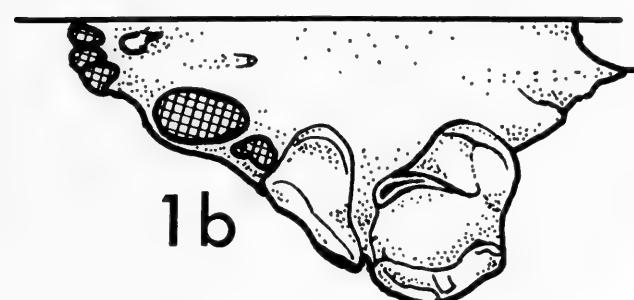
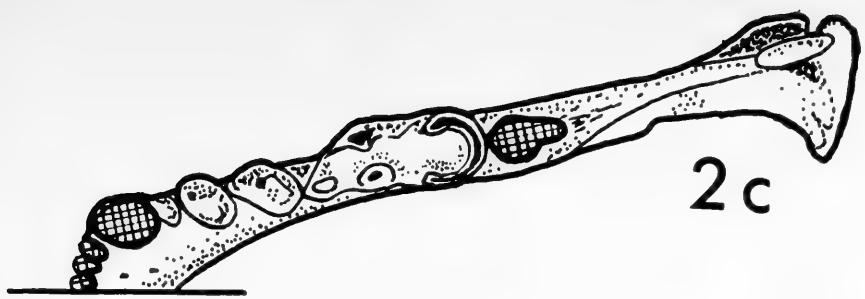


TABLE II—Comparative measurements of the upper dentition and measurements of adult skeletal elements of *Conepatus talarae* n. sp. Measurements of M¹ of +*C. mercedensis* and *C. humboldti* from Ameghino (1889). Symbols as for Table I.

UPPER DENTITION							
P ⁴	4343aR	4343bL	4343cR	4343dR	4343eR	4346L	4348L
Mesiodistal length	6.8	6.3	6.0	6.7	6.9	6.4	6.5
Buccolingual width	5.7	5.7	4.7	—	—	5.1	5.0
M ¹	4344aR	4344bL	4344cR	4346L	4347R	4348L	+ <i>C. mercedensis</i> <i>C. humboldti</i>
Mesiodistal length	7.0	7.7	6.7	6.7	6.2	7.2	8.0
Buccolingual width	8.7	9.6	8.2	8.8	8.5	9.2	10.0
POSTCRANIAL SKELETON							
<i>Cervical Vertebra</i>						C VI	
						4367	
Length of centrum						5.7	
Depth of centrum						3.9	
Transverse width of centrum						6.8	
Width across zygapophyses						12.4	
Length pre- to postzygapophyses						8.4	
Height of neural arch						6.0	
<i>Humerus</i>						2853L	4351R
Length normal to condyles						50.4e	50.5
Maximum length						51.2	51.4
Width over greater and lesser tuberosities						11.7	11.4
Maximum anteroposterior diameter of head						12.2	12.2
Anteroposterior diameter of head in bicipital groove						10.1	10.5
Midshaft transverse diameter						4.6	4.0
Midshaft anteroposterior diameter						7.7	6.3
Width across condyles						15.9	16.4
Width of trochlear groove						4.3	4.2
<i>Scapholunar</i>						4374R	
Maximum transverse diameter						10.7	
Proximodistal diameter						5.1	
Dorsoplantar diameter						6.4	
<i>Tibia</i>						2852R	
Maximum length						56.8	
Transverse diameter of proximal end						12.2	
Anteroposterior diameter of proximal end						9.9	
Midshaft transverse diameter						3.6	
Midshaft anteroposterior diameter						4.9	
Transverse diameter of distal end						9.2	
Anteroposterior diameter of distal end						6.9	
<i>Calcaneum</i>						4371R	4375L
Total length						16.7	16.8
Minimum width at plantaris groove						3.1	3.4
Maximum width at plantaris groove						4.6	4.6
Transverse diameter of distal end						5.4	4.9
Dorsoplantar diameter of distal end						5.3	5.3
							4376L

<i>Metapodials</i>	Mc III 4379L	Mc V 4377L	Mt III 4378L
Maximum length	15.0	14.3	19.0
Proximal dorsoplantar diameter	4.3	4.0	4.6
Proximal transverse diameter	3.0	3.2	3.7
Midshaft dorsoplantar diameter	2.5	2.3	2.6
Midshaft transverse diameter	2.5	2.2	2.5
Distal dorsoplantar diameter	3.5	3.1	3.1
Distal transverse diameter	3.9	3.4	3.5

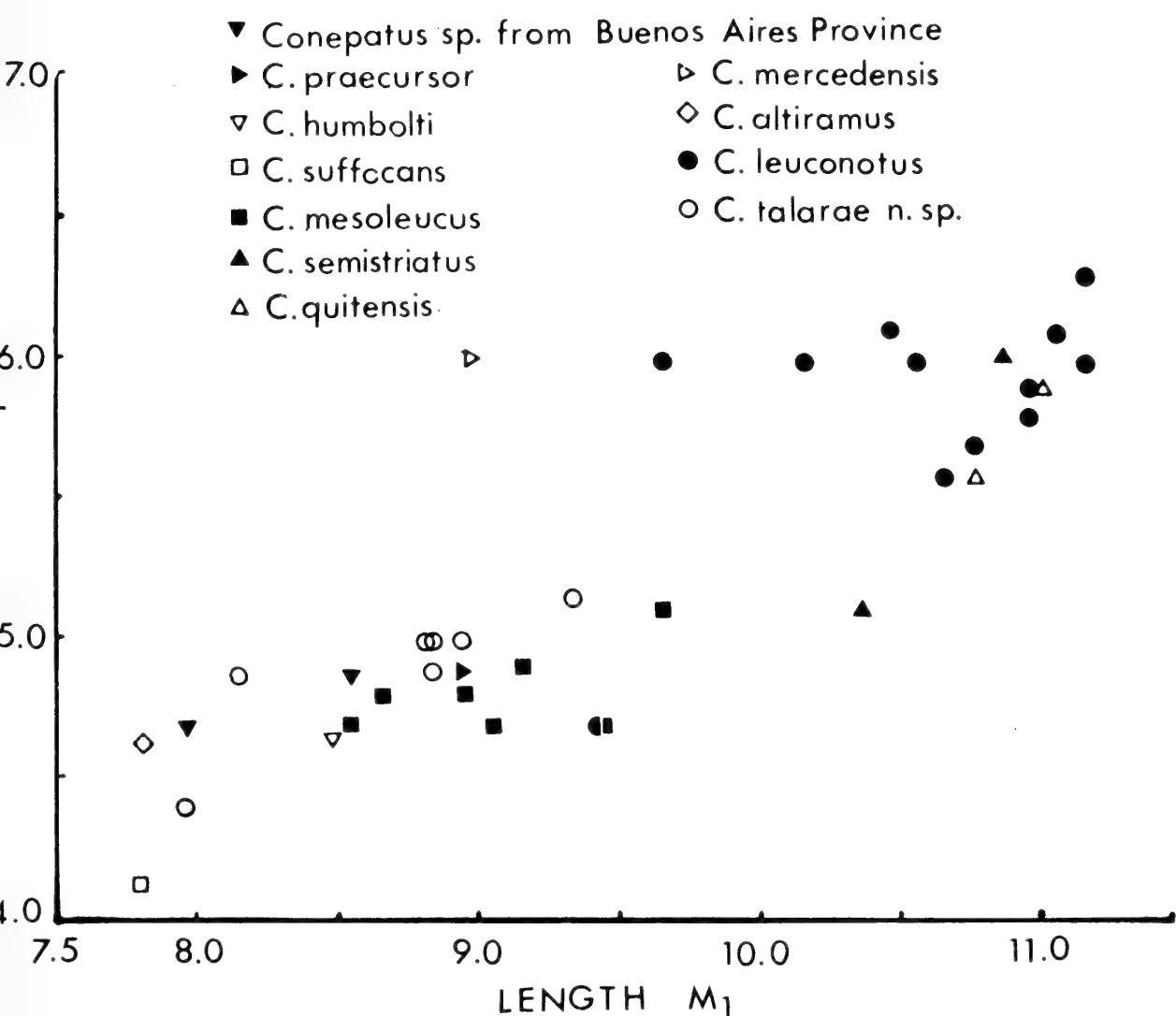


Figure 7—Scatter diagram comparing maximum mesiodistal lengths and buccolingual widths of M_1 in several species of Recent and Pleistocene *Conepatus*. Comparative data derived from Ray *et al.* (1963) for *C. leuconotus*, *C. mesoleucus*, *C. semistriatus* and the longer *C. quitensis*, and from Reig (1952) for +*C. altiramus*, *C. humboldti*, *C. suffocans*, +*C. mercedensis*, +*C. praecursor*, the shorter *C. quitensis* and *Conepatus* sp. from near Mar del Plata, Argentina. “+” indicates fossil species only.

TABLE III—Comparative measurements in mm of the mandibles and lower dentitions of *Conepatus talarae* n. sp. and + *C. altiramus* from near Mar del Plata, recent *Conepatus* sp. also from near Mar del Plata, *C. humboldti* from Santa Cruz, *C. suffocans* from El Quebrachal, Salta, all from Argentina, and *C. quitenensis* from Concepción, Ecuador, all after Reig (1952); + *C. praecursor* from the Ensenadian of Buenos Aires Province after Rusconi (1932); + *C. mercedensis* from the Bonaerian of Buenos Aires Province after Ameghino (1889); *C. primaevus* from the Bonaerian of Barracas, near Buenos Aires, after Burmeister (1879); and *C. semistriatus* and *C. quitenensis* after Ray *et al.* (1963). MMP—Museo Municipal, Mar del Plata; MACN—Museo Argentino de Ciencias Naturales, Mammal Collection or Ameghino Collection. “+” indicates a fossil form, “e” an estimated measurement and “a” an alveolar measurement

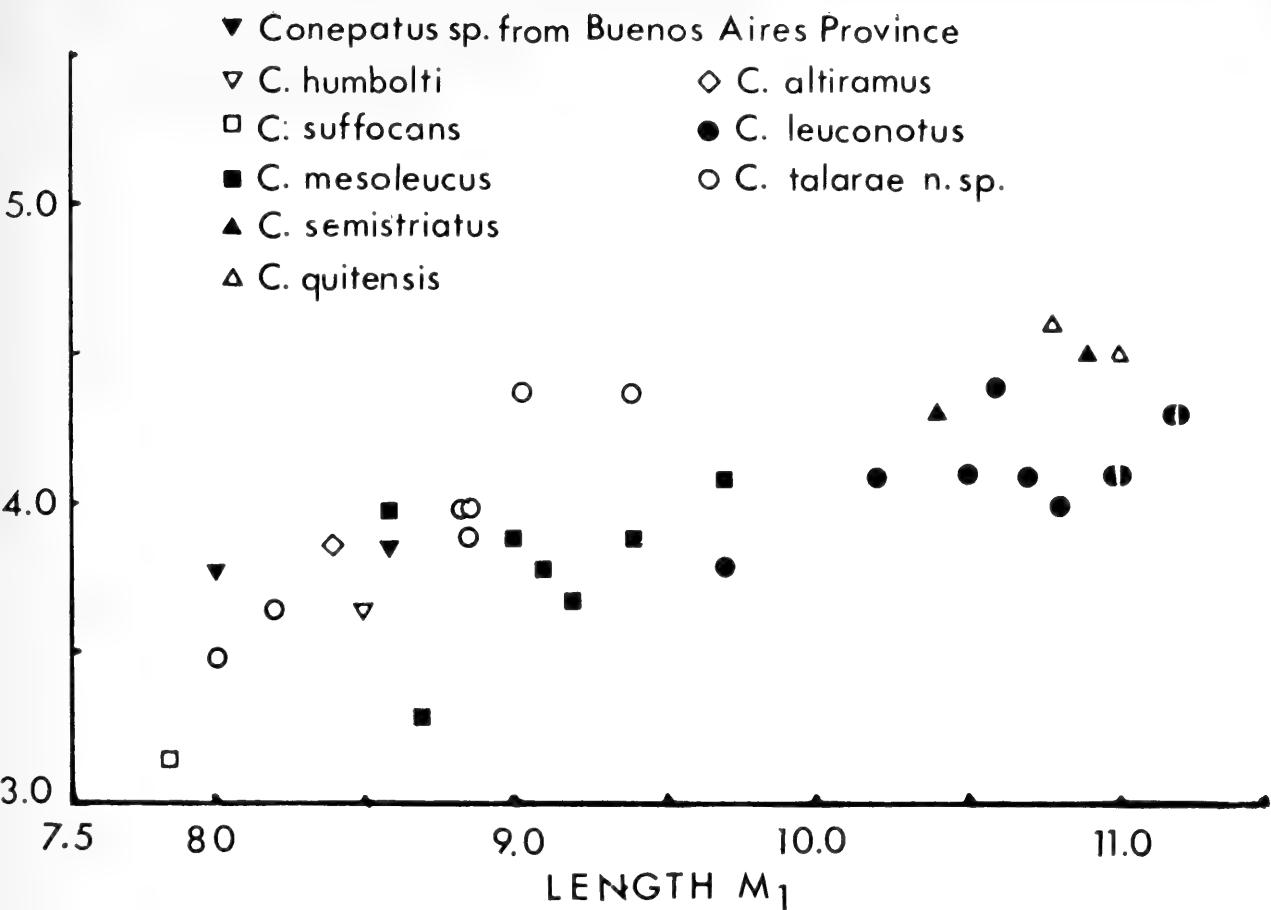


Figure 8—Scatter diagram comparing maximum mesiodistal lengths of M_1 and of the trigonid of M_1 in several species of Recent and Pleistocene *Conepatus*. Length of trigonid measured in straight line from anterior edge of paraconid to midpoint of protoconid-metaconid commissure. Comparative data and symbols as for Figure 7.

protocone and hypocone crests (Fig. 1b). A deep narrow notch has not been observed in the Talaran skunk's M_1 . However, the Talaran skunk can be assigned to *Conepatus* as general agreement exists in the characters of M_1 and P^4 cited by Ray *et al.* (1963) for the genus and because no other genus of skunks is known from South America.

Specific identification. Cabrera (1957) lists 5 species for the genus in the Recent fauna of South America (*C. castaneus*; *C. chinga* incl. *C. suffocans*, *C. humboldti*; *C. rex*; and *C. semistriatus* incl. *C. quitensis* and *C. amazonicus*). Reig (1952) gives some comparative measurements of fossil (*C. altiramus*, *C. praecursor* [=*C. mercedensis praecursor*] and *C. mercedensis*) and Recent forms (*C. humboldti*, *C. suffocans*, *C. quitensis* and *Conepatus* sp. from Mar del Plata). Ray *et al.* (1963) give comparative data for Recent *C. mesoleucus* and *C. leuconotus* and plot 3 dimensions of M_1 of two individuals of *C. semistriatus* and one of *C. quitensis*.

Table III shows that the Talaran *Conepatus* is one of the smaller members of the genus. It cannot therefore be conspecific with any of the larger forms, i.e. *C. semistriatus*, *C. rex* or *C. chinga*, or the fossil *C.*

primaevus, which derive from the high altitude Andean environments and from which it is separated ecologically and geographically. It is unlikely also that the Talaran *Conepatus* is directly related to *C. s. amazonicus* from the Amazon basin or to *C. ch. suffocans*, *C. castaneus* or *C. humboldti*, from the Bolivian and Argentinian pampas as the Andes provide a strong ecological barrier. Table III also suggests that the smaller Recent and fossil pampean forms comprise a single group and may represent fewer species than have been described.

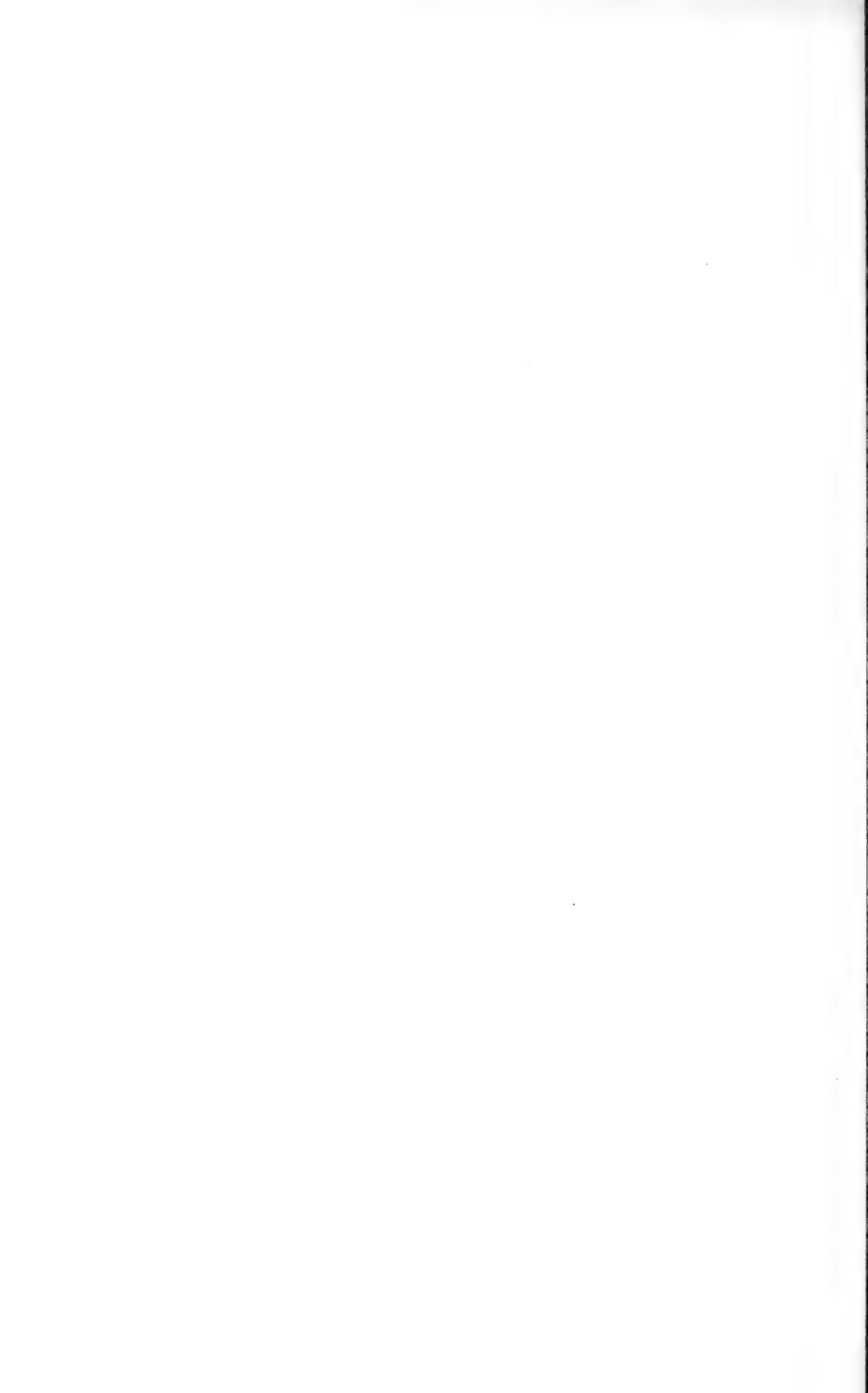
Figures 7 and 8 show that plots of the lengths and breadths of M_1 's of the Talaran *Conepatus* (after Ray *et al.*, 1963) fall near those of the Recent and fossil Argentinian forms and also near those of *C. mesoleucus*. However, since *C. mesoleucus* is restricted to North America and together with the fossil and Recent Argentinian forms are separated geographically from Talara by distance and mountains, it is likely that the similar dimensions represent only size convergence between the populations.

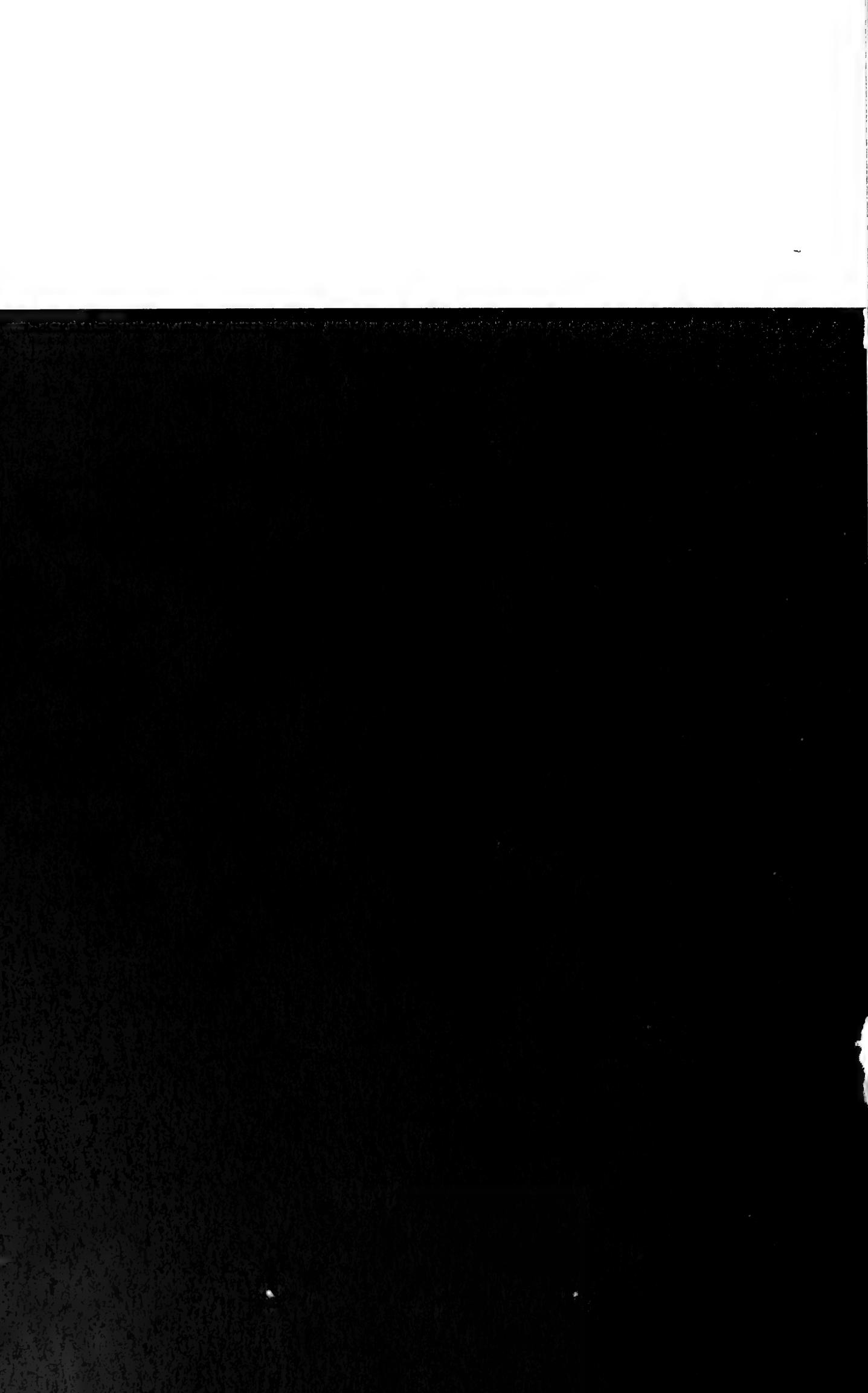
The distribution of the plots of M_1 in Figure 7 of the Talaran *Conepatus* lies almost parallel to those of M_1 's of the other larger samples of *Conepatus*. M_1 is therefore approximately similarly proportioned in its overall dimensions in all the representatives of *Conepatus* included in this figure. However the distribution of the plots for the Talaran *Conepatus* in Figure 8 lies at an inclined angle of about 45° while those of the other larger samples lie nearly horizontal. This divergence indicates a nearly constant mesiodistal length to the trigonid in the other forms regardless of the length of M_1 , the increase in length therefore resulting from elongation of the talonid, and in the Talaran *Conepatus* a trigonid that nearly maintains a constant proportion of the mesiodistal length of the tooth. This near-maintenance of the proportions of M_1 despite length variation separates the Talaran *Conepatus* from all other groups for which information is available and suggests an isolation of this population from the neighbouring populations of *Conepatus* sufficient to allow the development of a slightly different pattern of growth.

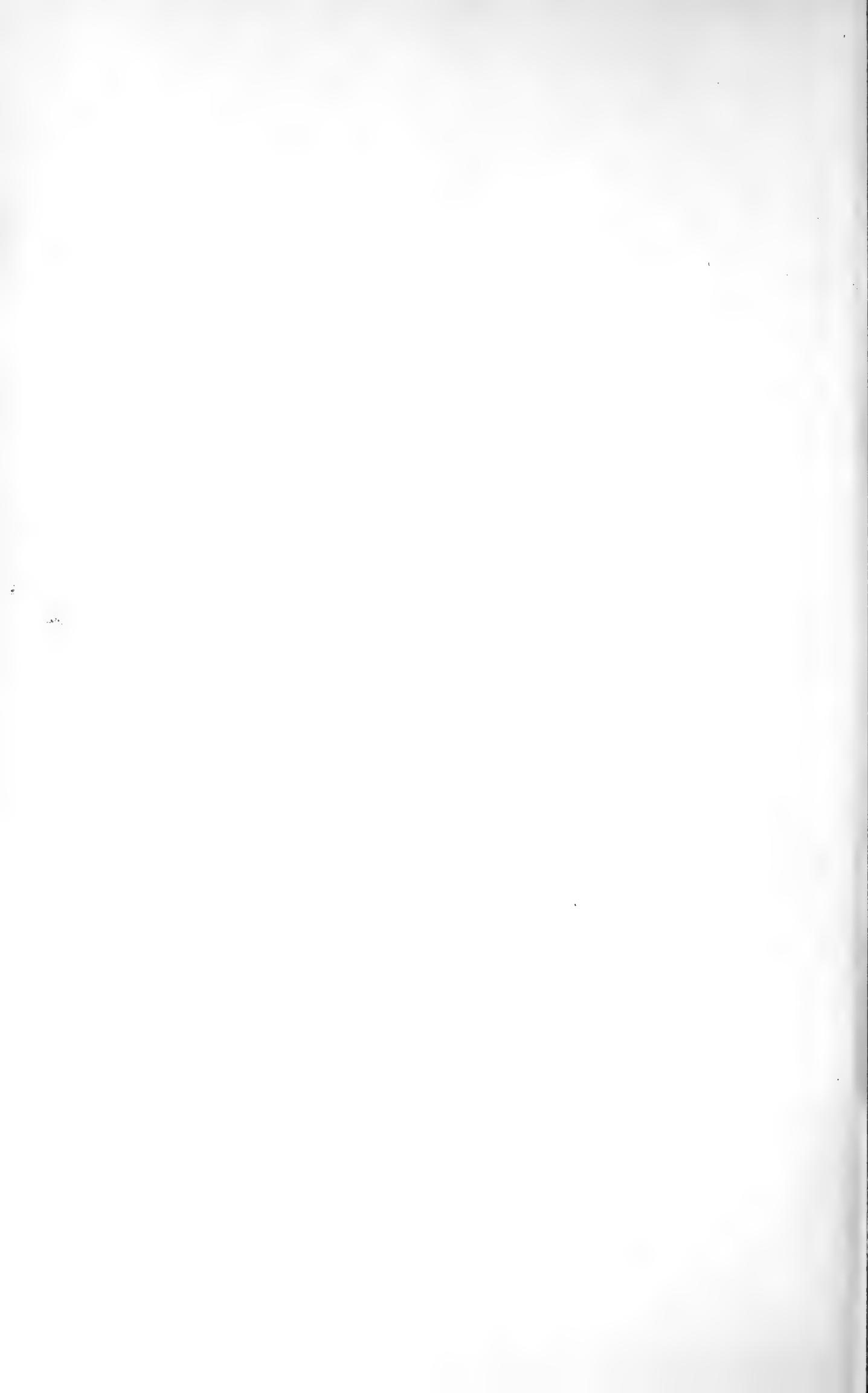
The Talaran *Conepatus* is therefore assigned to a new species, *Conepatus talarae* sp. nov. on the characters of the occlusal shape of M^1 , the shape of the mandibular symphysis and coronoid, the indication of a separate identity shown by the proportion of the trigonid to the talonid of M_1 and its geographical isolation from other members of the genus of comparable size.

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